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thorough re-investigation of certain parts of this subject began. One may be pardoned for asking whether the objectives known as apochromatics are to open up in this field new lines of research.

Can these recent discoveries relative to the continuity of protoplasm and the genetic relationship of the associated granules (including, in the widest sense, the nucleus) be made to cast any light on the question of development, as they certainly do upon the kindred question of adaptation? The answer has been given us very lately by Hugo de Vries of Amsterdam. This investigator, who has done very much to clear up certain obscurities in regard to the external relations of the cell, has recently revised the neglected doctrine of pangenesis, and applied it to the question just propounded. De Vries suggests that we divide the hypothesis of pangenesis as proposed by Darwin into two parts, as follows: 1. In every germ-cell, individual characters of the whole organism are represented by material particles, which, by their multiplication, transmit to descendants all of such peculiarities; 2. All the cells of the organism throw off, at certain periods of development, such material particles, which flow towards the germ-cells, supplying its deficiencies. Now, De Vries asks whether it is not high time for us to look at the first part of this hypothesis again, and abandon the hinderances which the latter part imposes. If we accept his suggestion, and restate the hypothesis, in view of what has been learned relative to the nucleus and other granules (the trophoplasts) within the cell, we should then read, "In every cell at a growing part are all the elements ready for multiplication. Each trophoplast possesses the organs necessary for continuous transmission; the nucleus for new nuclei, the trophoplasts for new granules of all kinds, according to the needs of the plant."

The author reviews the theories bearing on the question, from the so-called plastidules of Elsberg to the germ-plasma of Weismann, and then applies his hypotheses of intracellular pangenesis to the different parts of a single plant, and to the transmission of peculiarities. The active particles recognized in Darwin's hypothesis he terms "pangens," and, regarding them as vehicles of hereditary characters, traces them throughout their course. He is not obliged to ask for any means of transportation for these pangens, for they work, so to speak, on the spot. They are ready at hand at the points of growth. We must look very sharply with reference to this at two points of growth in the flowering plant; namely, the bud and the seed. Each bud, with its growing point made up of cells containing in their protoplasm the divisible granules, carries with itself all the peculiarities which have been transmitted without appreciable change. In the formation of the bud there is fission, but no blending. The cells divide, and each new one may in turn divide until the ultimate form of the leafy branch or flower is reached. In the leafy-branch new buds form, and in their turn carry forward the ancestral peculiarities; but in the flower, on the other hand, with the formation of the ovule all development is arrested (except in the rare cases of parthenogenesis and the like) unless the protoplasm of the embryonal sac receives a new impetus from material contributed by the pollen grain; and in this blending of parts which have developed under different external conditions, we see that there is a chance for variation to come in. Not only is there a blending of the nuclei, but a sharing of the accompanying trophoplasts. How this can be applied to the lower plants and other organisms cannot now be referred to. It would not be right to hold De Vries wholly responsible for the application just given, but I ask you whether the hypothesis does not appear fruitful. It seems likely to stimulate speculation and further research in this important field.

In view of De Vries' work, and of the results of recent study, which I have endeavored to bring before you this afternoon, does not the statement of Darwin possess new force? — "An organic being is a microcosm, a little universe formed of a host of self-propagating organisms inconceivably minute, and as numerous as the stars in heaven."

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HOUGHTON, MIFFLIN, & CO. have in press a biography of Wilbur Fisk, the Methodist minister, by Professor George Prentice of Wesleyan University, to form the second volume in their new series of American Religious Leaders.

#### THE ORNITHOLOGISTS' MEETING.

THE seventh congress of the American Ornithologists' Union began its session in the rooms of the American Museum of Natural History in this city, Nov. 12. Dr. C. Hart Merriam, from the committee on the migration and geographical distribution of birds, reported that no progress had been made in studying migration; but the Agricultural Department, he said, is now engaged in work relating to floral and faunal distribution. Individual species of birds are first located and mapped, and then these maps are co-ordinated so as to define the natural floral and faunal areas of the country. These maps will be colored so that one may see at a glance the boundaries in which certain flora and fauna abound. Dr. Robert W. Shufeldt, from the committee on the anatomy of birds, reported the progress made in the study of this anatomy for the years 1888 and 1889. The report named the books that had been published in Europe and America on this subject during the last two years. George B. Sennett, from the committee on the protection of North American birds, reported that the committee was doing what it could to protect useful birds and destroy others. They encouraged boys to kill sparrows, but to spare other birds. The New York law for the protection of birds was defective. This was to be regretted, for New York is the great market. The Pennsylvania law had been drawn with a knowledge of the defect in the New York law, and is the best law now in existence in any State.

On Wednesday, the 13th, Jonathan Dwight, jun., read a paper on "Birds that have struck the Statue of Liberty, Bedloe's Island, New York Harbor." He said, that, on account of its lighter color, more birds strike the pedestal to the statue than the statue itself. The statue was erected too late in 1886 for the migratory birds. The first to strike it was on May 19, 1887, and the next late in August, when the lights were said to be put out by birds. The first date at which birds struck the statue in 1889 was Aug. 5, when fourteen, were killed. A few others were killed during the month, and a considerable number in September and October. Oct. 24 was the last date at which birds were killed. The whole number killed this year was 690, which was considerably less than in 1888 or 1887. He found that every cold wave in the early fall was followed by migratory birds flying against the statue. Of the dead birds picked up this year, 60 per cent belonged to one species, the Maryland yellow-throats. The remaining 40 per cent included a great variety. A paper on "The Abundance of the Wild Pigeon in Central and Eastern New York in 1835," prepared by Professor R. W. Whitfield, was read by Mr. Dutcher. Early in the sixties there was a great flight of pigeons in the Hudson valley. Flocks were so large that one could not see their extent, and they cast shadows like clouds. Dr. C. Hart Merriam said the gregarious habits of pigeons had made their struggle for existence peculiarly hard, because they were so liable to attack on their breeding-ground. The result was, the few survivors have learned to abandon the old habits, and they now scatter and breed in isolated pairs. There was no danger that they would be exterminated. A paper was read by Dr. Edgar A. Mearns, entitled "Observations on the Avifauna of Arizona." After brief discussion, Dr. C. Hart Merriam read a paper entitled "Remarks on San Francisco Mountain and Vicinity (Arizona) from the Faunal Standpoint." "The Winter Distribution of the Bobolink, with Remarks on its Routes of Migration," was the subject of a paper by Frank M. Chapman. After some discussion, Mr. Chapman read another paper, "On the Changes of Plumage in the Bobolink."

At Thursday's session Mr. Leverett M. Loomis read a paper, giving his observations on some of the summer birds of the alpine-ports of Pickens County, S. C. Col. N. S. Goss, State ornithologist of Kansas, read two brief papers, — one on the question whether the poor-will and the frosted are varieties of the same species, or distinct; and the other on "The Mottled Duck in Kansas." Jonathan Dwight, jun., read a paper on "Some Birds observed near the Straits of Mackinaw during 1888." In a search for a pigeon-roost, Mr. Dwight came upon a parade-ground of migrating birds in Michigan, and, in a few days following the 20th of May, secured a great number. He had prepared a list of 119 species thus secured. Dr. Edgar A. Mearns read a paper, "The Western Form of the Warbling Vireo." Mr. William Brewster

gave the substance of two papers, — one on "The Little Brown Crane in Rhode Island," and the other on "The Capture of the Canada Jay near Cambridge, Mass."

At the closing session of the congress on Friday, President J. A. Allen presented a paper on the classification of the Maximilian types of South American birds now in the American Museum. He also presented a paper on "Seasonal and Individual Variation in Certain Flycatchers of the Genus *Elænea*." Mr. Frank M. Chapman read a paper on "The Forms of the Maryland Yellow-Throat." President Allen read a paper on classification, in which the difficulties of the work were made evident.

The next congress will be held in Washington the third Tuesday in November, 1890.

#### BOOK-REVIEWS.

*The Continuous Creation.* By MYRON ADAMS. New York, Houghton, Mifflin, & Co. 12°. \$1.50.

THIS work is one of those attempts, now so numerous, to reconcile Christianity and science. The author is a clergyman, and the views set forth in this volume are such as he has long taught to his congregation. He accepts the evolutionary philosophy quite as unreservedly as any scientist could do, and endeavors to show that it is in no way hostile to any essential truth of religion. There is nothing in his views or arguments that is specially new; but they are presented in a style that is somewhat above the ordinary, being not only clear and refined, but also of a true literary flavor. Mr. Adams holds the view, which other Christian thinkers have expressed, that evolution is "the mode of God in doing things, in causing things to come to pass." Creation is conceived as a continuous and never-ending process, and evolution as the universal law of becoming." This idea of continuous creation is nothing new, but has been held by many philosophers of the past, including the Alexandrian Christians. But the prevalent doctrine of the Church has regarded creation as a work done once for all by an omnipotent *fiat*; and hence, when the evolution theory appeared, it was found to be out of harmony with the orthodox view. Of course, Mr. Adams has no difficulty in showing that the new theory is in no way inconsistent with a philosophical theism. It is curious, however, that nearly all the criticisms of Christianity with which the world is now rife should be attributed to the evolutionary school, for very few of them are original with that school. Most of the changes now going on in the traditional religion are due to other influences, and would have taken place just the same if evolution had never been thought of. How far those changes have already gone, Mr. Adams's book plainly shows; for his Christianity is so different from that of former times that it is hardly recognizable under the same name. But he shows an excellent spirit and a true religious earnestness, and his work will be interesting to those who are interested in its subject.

*The Public Regulation of Railways.* By W. D. DABNEY. New York, Putnam. 12°. \$1.25.

THIS is one of the most sensible books on the railway question that we have seen, though it cannot be said to offer much that is original. Most writers who discuss the railway question are animated either by hostility to the railway companies or by partiality for them; and it is pleasant to read a work that discusses the subject in a judicial spirit. Mr. Dabney's book consists of two parts: the first dealing with the legal aspects of the subject; the second, with the economical. He is opposed to any scheme for the purchase and operation of the railways by the government, and gives the usual reasons for this view. But, on the other hand, he holds that the partial monopoly that necessarily attaches to the railway business, and the vast power over industrial interests which the companies wield, make it necessary that they should be carefully supervised by public authority. He goes into the details of many judicial decisions and questions of law affecting the railways, and then takes up such questions as those of pooling, discrimination, "the long and short haul," and many others; and his opinions, whether one agrees with them or not, are evidently the result of careful study. He condemns discrimination between persons in unqualified terms, but thinks that discrimination in favor of certain

places is sometimes not only justifiable, but inevitable. The work is worthy of perusal by all who wish to understand the subject and to see justice done to all parties.

*Pawnee Hero Stories and Folk-Tales.* By GEORGE B. GRINNELL. New York, Forest and Stream Publ. Co. 12°. \$2.

THE author of this work has lived for several years among the Pawnees, and, during his last visit to the tribe, gathered as many of their familiar stories as he could, and set them down in writing precisely as they were told to him. The hero stories are mostly warlike, and relate particularly to horse-stealing, which, as Mr. Grinnell reminds us, was simply a mode of warfare. It appears that the Pawnees are adepts in personating wolves by dressing themselves in skins or other appropriate disguises, and crawling on all-fours; and by this means they could approach close to an enemy's camp without being discovered. Many of these stories recount such exploits, and some are quite diverting. The folk-tales are far more fantastic, and are full of the marvellous; as, for instance, the story of the Dun Horse. This animal was very wise and a good conversationist; but after a while he died, and the men of the tribe cut him up into little pieces. Very soon, however, a strong wind blew upon the pieces, and they were put together again, and the horse restored to life.

Besides these native stories, Mr. Grinnell gives us a series of notes on the Pawnee people and their customs, which will be of use to students of such subjects. He attempts to trace the origin and migrations of the tribe, but reliable information on these points is very scanty. The religious sentiments of the Pawnees are said to be strong, and their religious exercises frequent and fervent. Some marvellous and inexplicable tales are told, and stated to be true, of the doings of their medicine-men. The Pawnees are now settled in the Indian Territory, and are rapidly dwindling in numbers. When the author first visited the tribe, "it numbered more than three thousand people: now there are only a little more than eight hundred of them." He thinks that some measures ought to be taken to preserve a record of their language, and suggests that the Smithsonian Institution should take the matter up.

*Electricity in our Homes and Workshops.* By SYDNEY F. WALKER. New York, Van Nostrand. 16°.

THE ground covered by this work is somewhat limited, but it is gone over thoroughly and conscientiously, leaving little to be desired even by the most exacting. The intention of the author when he began his task, as intimated in the preface, was to cover the whole ground occupied by electrical apparatus; but circumstances compelled him to limit his labors to what are known as auxiliaries to the practical business of life, — those in which only small currents are used. We hope, however, that the author, when he realizes the eagerness with which books on such subjects, written by competent men, are looked for by all interested in the popular side of electrical progress, will give us something in a similar vein on electric lighting, transmission of power, electrical measurements, and other topics.

Mr. Walker explains, in easily understood terms, the every-day working of many of the forms of electrical apparatus with which experience has made us more or less familiar; that is to say, he explains, in language devoid of unnecessary technicalities, the working of an electric circuit, the properties and application of the magnet, and the theory and operation of galvanic batteries. He also gives some chapters to electric bells and their fittings, to electric mining signals and their operation, and to telephonic apparatus. But the most interesting chapter in the book is that which the author calls a "glossary of terms," but which is really something more. It is by far the best popular explanation of electrical terms, considering its brevity, that we know of; and, now that the daily press is giving us a brief respite from the "overhead wire" sensation, we would commend this glossary to the newspaper reporters, so that they may be prepared to do full justice to the technicalities of electricity as soon as that subject comes uppermost again. The multifarious uses of the electrical current have become so necessary a part of our daily life, that those who wish to speak or write intelligently of it must pay attention to its terminology.

The book is well printed, neatly and substantially bound, and is illustrated by 127 engravings.